

IN THE CLAIMS:

Cancel claims 8-22 without prejudice.

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- 1 1. (Amended) A catalyst system comprising:
2 a complex with the formula:
3 $[ML_y(HSR)_n]^n$
4 wherein M is a transition metal cation;
5 L is a ligand;
6 $\forall y$ is a whole number between 0 and 5;
7 n is a whole number between 1 and 6;
8 n is the charge of the complex;
9 H is Hydrogen;
10 S is sulphur; and
11 R is any organic group or hydrogen.
- 1 2. (Original) The system of claim 1, wherein the transition metal is selected from the
2 group consisting of cobalt, manganese, chromium and iron.
- 1 3. (Original) The system of claim 2, wherein M is selected from the group consisting
2 of Co^{2+} , Mn^{2+} , Fe^{2+} , and Cr^{3+} .
- 1 4. (Amended) The system of claim 1, wherein the organic group is an alkyl or aryl
2 group ~~having between one to twenty carbon atoms.~~

- 1 5. (Original) The system of claim 4, wherein the alkyl or aryl group contains sul-
2 phur, nitrogen or oxygen atoms.

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- 1 6. (Amended) ~~The catalyst of claim 1~~ A catalyst system comprising:
2 a complex with the formula:
3 $[ML_y(HSR)_n]^{n-}$
4 wherein M is a transition metal cation;
5 L is a ligand;
6 y is a whole number between 0 and 5;
7 \tilde{n} is a whole number between 1 and 6;
8 n is the charge of the complex;
9 H is Hydrogen;
10 S is sulphur; and
11 R is any organic group or hydrogen, wherein L is selected from the group con-
12 sisting of cyano, amino, aquo, hydroxo, thiocyanato, trifluoroborato, phosphino, nitro,
13 nitrato, and carboxo.

- 1 7. (Amended) ~~The catalyst of claim 1~~ A catalyst system comprising:
2 a complex with the formula:
3 $[ML_y(HSR)_n]^{n-}$
4 wherein M is a transition metal cation;
5 L is a ligand;
6 y is a whole number between 0 and 5;
7 \tilde{n} is a whole number between 1 and 6;
8 n is the charge of the complex;

9 H is Hydrogen;

10 S is sulphur; and

11 R is any organic group or hydrogen, wherein -L is a chelating agent selected from
12 the group consisting of dimethylglyoxime, phenanthroline, and ethylenediamine.

1 8. (Canceled) A method of preparing a polymer comprising:

2 providing an organic compound to be polymerized;

3 contacting the organic compound with a catalyst represented by the formula:

4 $[ML_y(HSR)_{\tilde{n}}]^n$

5 wherein M is a transition metal cation in a lower oxidation state;

6 L is a ligand;

7 Y is a whole number between 0 and 5;

8 \tilde{n} is a whole number between 1 and 6;

9 n is the charge of the complex;

10 H is Hydrogen;

11 S is sulphur; and

12 R is any organic group or hydrogen.

1 9. (Canceled) The method of claim 8, wherein M is selected from the group con-
2 sisting of cobalt, manganese, chromium and iron.

1 10. (Canceled) The method of claim 8, wherein M is selected from the group con-
2 sisting of Co^{2+} , Mn^{2+} , Fe^{2+} , and Cr^{3+} .

- 1 11. (Canceled) The method of claim 8, wherein the organic group is an alkyl or aryl
2 group having between one to twenty carbon atoms.
- 1 12. (Canceled) The method of claim 11, wherein the alkyl or aryl group contains sul-
2 phur, nitrogen or oxygen atoms.
- 1 13. (Canceled) The method of claim 11, wherein the organic compounds are selected
2 from the group consisting of olefins, conjugated dienes, vinyl compounds, allyl com-
3 pounds and mixtures thereof.
- 1 14. (Canceled) The method of claim 8, wherein the organic compound is selected from
2 the group consisting of styrene, methyl styrene, acrylonitrile, acrylic acid, methacrylic
3 acid, acrylamide, methacrylamide, methyl methacrylate, ethyl methacrylate, maleic an-
4 hydride, maleic acid, fumaric acid, isoprene, butadiene, chloroprene, vinyl acetate, vinyl
5 chloride, vinylidene chloride, ethylene, propylene, butylene, isobutylene, alpha-olefins,
6 allyl alcohol, alkyl vinyl ethers, and mixtures thereof.
- 1 15. (Canceled) The method of claim 8 wherein the organic compound to be polymer-
2 ized is selected from the group consisting of unsaturated polyester resins, vinyl ester res-
3 ins, alkyl resins, and glyptal resins.
- 1 16. (Canceled) The method of claim 8 wherein the method of preparing the polymer
2 is selected from the group of techniques consisting of the system of mass, solution, sus-
3 pension and emulsion.

1 17. (Canceled) The method of claim 11, and further comprising preparing the catalyst
2 including

3 providing a transition metal containing compound selected from either the group
4 of inorganic salts consisting of sulphates, nitrates, phosphates, and chlorides, or the group
5 of organic compounds consisting of acetates, oxalates, hexanoates, octoates, oleates, de-
6 canoates, palmitates, decanoates, naphthenates, and stearates; and

7 contacting the transition metal containing compound with a thiol or mercaptan
8 having less than 20 carbon atoms.

1 18. (Canceled) The method of claim 17 wherein the sulphur compounds and thiols or
2 mercaptans are monofunctional and selected from the group consisting of hydrogen sul-
3 phide, methyl, ethyl, propyl, butyl, , hexyl, octyl, decyl, dodecyl, stearyl, benzyl, naph-
4 thyl, benzoyl, mercaptans and thiols, thioglycolic acid, and any mercaptan or thiol con-
5 taining less than twenty carbons.

1 19. (Canceled) The method of claim 18 wherein the transition metal compound is a
2 carboxylated transition metal selected from the group of salts consisting of cobalt, ma-
3 ganese, chromium, and iron salts, and the thiol or mercaptan includes a group selected
4 from the group consisting butyl, hexyl, dodecyl, benzyl, benzoyl groups, hydrogen sul-
5 phide, thiohglycolic acid, and any alkyl or aryl group containing one to twenty carbons
6 atoms.

1 20. (Canceled) The method of claim 8, and further comprising preparing the catalyst
2 including

3 providing a transition metal compound selected from the group of carboxylates
4 consisting of cobalt carboxylates, manganese carboxylates, chromium carboxylates and

5 iron carboxylates or from the group of inorganic salts consisting of sulphates, nitrates,
6 phosphates, and chlorides;

7 reacting an alkyl or aryl halide containing one to twenty carbon atoms with two
8 equivalents of aqueous thiourea to form a hydrolyzed product; and

9 reacting the product with the transition metal compound.

1 21. (Canceled) The method of claim 8, wherein L is selected from the group consist-
2 ing of cyano, amino, aquo, hydroxo, thiocyanato, trifluoroborato, nitro, nitrato, phos-
3 phino, and carboxo.

1 22. (Canceled) The method of claim 8, wherein L is a chelating agent and selected from
2 the group consisting of dimethylglyoxime, phenanthroline, and ethylenediamine.
